

Conditional conv.

$$\sum |a_n| \text{ diverges}$$

$$\sum a_n \text{ converges} \quad \text{AST}$$

abs convergence

$$\sum |a_n| \text{ converges}$$

$$\text{so } \sum a_n \text{ converges}$$

Feb 10-7:30 AM

31.

$$\sum_{n=1}^{\infty} \frac{\cos(n\pi)}{n} = -1 + \frac{1}{2} - \frac{1}{3} + \frac{1}{4} \dots$$

conv by AST

$$\sum \left| \frac{\cos(n\pi)}{n} \right| = 1 + \frac{1}{2} + \frac{1}{3} \dots$$

diverges - harmonic

conditional  
convergence

or

converges conditionally

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41.  $\sum_{n=1}^{\infty} \frac{x^n}{n\sqrt{n} 3^n}$

1.  $\lim_{n \rightarrow \infty} \left| \frac{x^{n+1}}{(n+1)\sqrt{n+1} 3^{n+1}} \cdot \frac{n\sqrt{n} 3^n}{x^n} \right| < 1$

$\lim_{n \rightarrow \infty} \left| \frac{x}{3} \cdot \frac{n}{n+1} \sqrt{\frac{n}{n+1}} \right| < 1$

2.  $X = -3$

$\sum_{n=1}^{\infty} \frac{(-3)^n}{n\sqrt{n} 3^n}$   $\left(\frac{-3}{3}\right)^n$   $\frac{|x|}{3} < 1$

$\sum_{n=1}^{\infty} \frac{|(-1)^n|}{n^{3/2}}$   $(-1)^n$   $|x| < 3$

$-3 \leq x \leq 3$

p series  $p = 3/2$   
converges absolutely

$io \in [-3, 3]$

3.  $X = 3$   $\sum \frac{1}{n^{3/2}}$

p series  $p = 3/2$   
converges

b. abs conv  $[-3, 3]$

c. conditional never

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49.  $\sum_{n=1}^{\infty} \frac{(x+\pi)^n}{\sqrt{n}}$

1.  $\lim_{n \rightarrow \infty} \left| \frac{(x+\pi)^{n+1}}{\sqrt{n+1}} \cdot \frac{\sqrt{n}}{(x+\pi)^n} \right| < 1$

2.  $X = -1-\pi$   $|x+\pi| < 1$

$\sum \frac{|(-1)^n|}{\sqrt{n}}$   $-1 < x+\pi < 1$

abs divergence  $-1-\pi \leq x < 1-\pi$

p-series  $p = 1/2$

$\sum \frac{(-1)^n}{\sqrt{n}} = -1 + \frac{1}{\sqrt{2}} - \frac{1}{\sqrt{3}} + \frac{1}{\sqrt{4}} \dots$  conv by AST

3.  $X = 1-\pi$

$\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}$  diverges  $p = 1/2$   
p series

a)  $[-1-\pi, 1-\pi)$   $io \in$

b)  $(-1-\pi, 1-\pi)$  abs. convergence

c)  $x = -1-\pi$

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60.

$$\ln(1+x) = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \frac{x^5}{5} \Big|$$

$$\ln \frac{3}{2} \approx 1 - \frac{1}{2^2 \cdot 2} + \frac{1}{2^3 \cdot 3} - \frac{1}{2^4 \cdot 4} + \frac{1}{2^5 \cdot 5} \Big|$$

$x = \frac{1}{2}$

$\ln\left(\frac{3}{2}\right)$

*overestimate*

$$\leq < \left| \frac{-x^6}{6} \right|$$

Feb 10-8:12 AM

Th. review ch 9 rev syllabus  
 Fr review  
 M practice test  
 Tu real test

Feb 10-8:17 AM

Which test

1.  $n^{\text{th}}$  term test      works for pos & neg terms  
     if  $\text{seq} \rightarrow 0$  ?  
     if  $\text{seq} \not\rightarrow 0$  series div
2. p-series  $\sum \frac{1}{n^p}$        $p > 1$  conv  
      $p \leq 1$  div
3. geometric (exponential)  $\sum ar^{n-1}$   $\leq r^n$   
      $|r| < 1$  conv to  $\frac{a}{1-r}$        $a + ar + ar^2 + \dots$   
      $|r| \geq 1$  div
4. ratio test - factorials and/or part exponentials
5. AST when signs alternate
6. absolute conv?  $\sum |a_n|$
7. integral test  
     direct comparison  
     \* limit comparison - compare with something more simple

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